

REMARKS

Entry of the foregoing, reexamination and further and favorable reconsideration of the above-identified application in view of the following remarks is respectfully requested.

By the foregoing amendment, claims 1-2, 4-11, and 15-18 have been canceled, without prejudice or disclaimer to the subject matter disclosed therein. Claims 13 and 14 have been amended to recite that the 24,25-methylenecholest-5-en-3 β -ol compositional ratio is in a proportion of 1.2 or less with respect to the desmosterol compositional ratio. Support for this amendment may be found, at the very least, on page 10, lines 12-15 of the specification as filed. Support for the amendment to claim 19 may be found, at the very least, in Example 2 of the specification as filed. Support for new claims 32-46 may be found, at the very least, in the claims as originally filed and throughout the specification as filed. No new matter has been added by the present amendment.

Rejection of Claim 14 Under 35 U.S.C. § 112, Second Paragraph

Claim 14 has been rejected under 35 U.S.C. § 112, second paragraph, for purportedly being indefinite. Applicants respectfully traverse this rejection.

The Examiner purports that claim 14 recites a broad range together with a narrower range. Applicants disagree. As can be seen from the specification on page 9, lines 34-37, “the ratio of the peak area (of chromatogram) detected for 24,25-methylenecholest-5-en-3 β -ol with respect to the sum of all the peak areas is the compositional ratio of 24,25-methylenecholest-5-en-3 β -ol”, the compositional ratio of 24,25-methylenecholest-5-en-3 β -ol is a ratio of this compound with respect to the total amount of fatty acids, because the

sum of all the peak areas in a chromatogram means the total amount of all fatty acids. Therefore, the compositional ratio of 24,25-methylenecholest-5-en-3 β -ol is of a different nature than the "24,25-methylenecholest-5-en-3 β -ol compositional ratio with respect to the desmosterol compositional ratio". In other words, the arachidonic acid-containing oil of claim 14 has a compositional ratio of 24,25-methylenecholest-5-en-3 β -ol of 35% or lower, and a compositional proportion of 24,25-methylenecholest-5-en-3 β -ol to desmosterol of 1.2 or less. Thus, claim 14 does not recite both a broad range and a narrow range.

In light of these remarks, applicants respectfully request withdrawal of this rejection under 35 U.S.C. § 112, second paragraph.

Rejection of Claims 1-2, 4-11 and 19-29 Under 35 U.S.C. § 102(b)

Claims 1-2, 4-11 and 19-29 have been rejected under 35 U.S.C. § 102(b) for purportedly being anticipated by Shinmen et al and Shimizu et al. Claims 1-2 and 4-11 have been canceled, thus rendering their rejection moot. This rejection will be discussed as it applies to claims 19-29. Applicants respectfully traverse this rejection.

According to the Examiner, Shinmen et al disclose the production of arachidonic acid-containing lipid by culturing a microorganism of the genus *Mortierella* subgenus *Mortierella* in a medium containing a nitrogen source of soybean meal. On the other hand, Shimizu et al disclose a lipid having a 24,25-methylenecholest-5-en-3 β -ol compositional ratio of 21% and 24,25-methylenecholes-5-en-3 β -ol compositional ratio in a proportion of 0.37 with respect to the desmosterol compositional ratio. According to the Examiner, the process used by Shinmen et al is similar to the one used by Shimizu et al, and therefore

purportedly the product of Shinmen et al inherently has the proportional ratios disclosed by Shimizu et al. Applicants disagree.

The claims of the present invention, as now amended, claim a process for production of an unsaturated fatty acid-containing oil. This process is carried out by culturing with aeration in a fermenter a microorganism belonging to the genus *Mortierella* subgenus *Mortierella*. The culturing medium used in the present invention contains a nitrogen source derived from soybean wherein the ratio of the nitrogen source derived from soybean with respect to the total nitrogen source in the medium is at least 86%.

Applicants found that when (1) the culturing is carried out with aeration, and (2) a culture medium containing a nitrogen source derived from soybean, wherein the ratio of the nitrogen source derived from soybean with respect to the total nitrogen source is at least 86%, is used, an arachidonic acid-containing oil simultaneously having (1) a higher arachidonic acid content (*i.e.*, an arachidonic acid content of 18 to 54% with respect to the total amount of fatty acids), and (2) a lower content of 24,25-methylenecholest-5-en-3 β -ol (*i.e.*, a 24,25-methylenecholest-5-en-3 β -ol compositional ratio of 36% or lower with respect to the total amount of fatty acids, and a 24,25-methylenecholest-5-en-ol compositional ratio in a proportion of 0.14 or less with respect to the desmosterol compositional ratio) can be produced.

Shimizu et al does not disclose an oil having a arachidonic acid compositional ratio as high as that of the oil of the present invention. Furthermore, Shinmen et al does not disclose a culture medium having the claimed ratio of soybean nitrogen with respect to the total nitrogen source. Therefore, there is no reasonable basis to believe that the oil product

described in the Shinmen et al reference inherently has a high arachidonic acid compositional ratio and a low 24,25-methylenecholest-5-en-3 β -ol compositional ratio, since the process used by Shinmen et al does not involve a culture medium containing a nitrogen source derived from soybean, wherein the ratio of the nitrogen source derived from soybean with respect to the total nitrogen source is at least 86% (conditions the applicants found necessary to obtain an oil product having a high arachidonic acid compositional ratio and a low 24,25-methylenecholest-5-en-3 β -ol compositional ratio). Thus, Shinmen et al and Shimizu et al do not disclose every aspect of the present invention, and therefore do not anticipate the present invention.

In light of these remarks, applicants respectfully request withdrawal of this rejection under 35 U.S.C. § 102(b).

Rejection of Claims 13-18 and 30-31 Under 35 U.S.C. § 103(a)

Claims 13-18 and 30-31 have been rejected under 35 U.S.C. § 103(a) for purportedly being unpatentable over Shinmen et al in view of both Shimizu et al and Barclay. For at least all of the reasons set forth below, withdrawal of this rejection is believed to be in order.

Shinmen et al disclose the production of arachidonic acid-containing lipid by culturing a microorganism of the genus *Mortierella* subgenus *Mortierella* in a medium containing a nitrogen source of soybean meal. Shinmen et al does not disclose or suggest the presence of 24,25-methylenecholest-5-en-3 β -ol in the disclosed oil. Shinmen et al further does not disclose or suggest using an oil, containing arachidonic acid and 24,25-

methylenecholest-5-en-3 β -ol, in food product, including baby food and animal food products.

Shimizu et al disclose a lipid having a 24,25-methylenecholest-5-en-3 β -ol compositional ratio of 21% and 24,25-methylenecholes-5-en-3 β -ol compositional ratio in a proportion of 0.37 with respect to the desmosterol compositional ratio. Shimizu et al also disclose that such a lipid has not been found in nature.

Barclay discloses that oil containing arachidonic acid can be used in food products, including baby food and animal products.

Even if the disclosures of all of the cited references are taken together, the combined disclosure does not disclose or suggest the present invention. As mentioned above, there is no reasonable basis to believe that the oil product described in the Shinmen et al reference inherently has a high arachidonic acid content (i.e. 18 to 54%) and a low 24,25-methylenecholest-5-en-3 β -ol compositional ratio (i.e., a 24,25-methylenecholest-5-en-3 β -ol compositional ratio in a proportion of 1.2 or less with respect to the desmosterol compositional ratio), since the process used by Shinmen et al does not involve a culture medium containing a nitrogen source derived from soybean, wherein the ratio of the nitrogen source derived from soybean with respect to the total nitrogen source is at least 86% (conditions the applicants found necessary to obtain an oil product having a high arachidonic acid compositional ratio and a low 24,25-methylenecholest-5-en-3 β -ol compositional ratio). Furthermore, given that Shimizu et al uses a similar process to the one used in Shinmen et al, there is no reason to believe that the oil disclosed by Shimizu et al has the properties discussed above (i.e. high arachidonic acid content, and low 24,25-

methylenecholest-5-en-3 β -ol content). Thus, claims 13 and 14 are not obvious in view of Shinmen et al and Shimizu et al, since neither reference discloses the arachidonic acid-containing oils of the present invention (which have a high arachidonic acid content, and low 24,25-methylenecholest-5-en-3 β -ol content).

With regards to claims 30 and 31 (claims to an immature infant formula and animal feed comprising the arachidonic acid-containing oil of the present invention, respectively) the combined teachings of Shinmen et al, Shimizu et al and Barclay do not disclose or suggest the present invention. As discussed above, Barclay discloses that oil containing arachidonic acid can be used in food products, including baby food and animal products. Barclay does not disclose or suggest using an arachidonic acid-containing oil having a high arachidonic acid content, and low 24,25-methylenecholest-5-en-3 β -ol content. In fact, as the Examiner states, the prior art teaches away from such food products since 24,25-methylenecholest-5-en-3 β -ol was not previously found in nature, and the toxicity of this compound was not known. Thus, there would be no motivation to combine the disclosures of Barclay with the disclosures of Shinmen et al and Shimizu et al to arrive at the present invention, since one would not know whether such an oil containing 24,25-methylenecholest-5-en-3 β -ol would be toxic.

Furthermore, even if the disclosures of Barclay, Shinmen et al and Shimizu et al were combined, one would not arrive at the present invention. None of these references disclose or suggest the arachidonic acid-containing oils of the present invention (which have a high arachidonic acid content, and low 24,25-methylenecholest-5-en-3 β -ol content). Thus, none of these references, either alone or together, could possibly suggest a food

product containing the arachidonic acid-containing oils of the present invention.

Therefore, none of these references, either alone or taken together, disclose or suggest the present invention.

In light of these remarks, applicants respectfully request withdrawal of this rejection under 35 U.S.C. § 103(a).

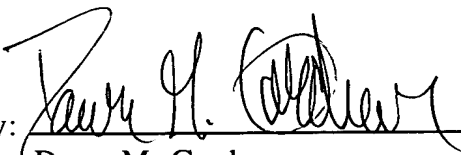
CONCLUSION

From the foregoing, further and favorable action in the form of a Notice of Allowance is believed to be next in order, and such action is earnestly solicited.

In the event that there are any questions relating to this application, the Examiner is invited to telephone the undersigned so that prosecution of the subject application may be expedited.

Respectfully submitted,

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Date: September 22, 2000